Two-dimensional horn imaging arrays (abstract)

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A two-dimensional horn imaging array has been demonstrated at 242 and 93 GHz. In this configuration, a dipole is suspended in a pyramidal horn, fabricated by an anisotropic chemical etch technique, on a 1-μm silicon-oxynitride membrane. This approach leaves room for low-frequency lines and processing electronics. Pattern measurements on a 1.45-λ imaging array agree well with theory, show no sidelobes, and a 3-dB beamwidth of 35° and 46° for the E and H planes, respectively. Application areas include a superconducting tunnel-junction receiver for radio astronomy and imaging arrays for real-time electron density mapping in fusion plasmas. Support for this project was provided by DOE contract DE-FG03-86-ER-53225 (subcontracted from U.C.L.A.).

Density profile reconstructions from 2-D interferometric data on Microtor using novel tomographic analysis techniques (abstract)[a]

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Plasma tomographic reconstructions are subject to aliasing ambiguity as a result of the limited angular and radial sampling rates for the line-integrated data. The two-view interferometer installed on the Microtor tokamak yields unambiguous information, specifically, a collection of six low-order alias-free moments of the 2-D electron density distribution. The unspoiled coefficients can be related to physically intuitive quantities and so yield information pertinent to the equilibrium and dynamical behavior of the plasma column. Alternatively, they can be used as constraints for a maximum entropy reconstruction of the source to produce an image free of aliasing artifacts.

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